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ORIGINAL

FLOOD INSURANCE STUDY

TOWN OF PUTNAM VALLEY, NEW YORK
PUTNAM COUNTY

SEPTEMBER 4, 1987

Federal Emergency Management Agency

COMMUNITY NUMBER - 361030

COD

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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PUBLISHED SEPARATELY:

Flood Insurance Rate Map

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FLOOD INSURANCE STUDY
TOWN OF PUTNAM VALLEY, NEW YORK

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Town of Putnam Valley, Putnam County, New York, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert Putnam Valley to the regular program of flood insurance by the Federal Emergency Management Agency (FEMA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.3. In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by Andrews & Clark, Inc., for the FEMA, under Contract No. H-6810. This work was completed in June 1982.

1.3 Coordination

An initial Consultation and Coordination Officer's (CCO) meeting was held on May 29, 1979 and was attended by Town of Putnam Valley officials, representatives of the FEMA and the study contractor. The purpose of this meeting was to explain Flood Insurance Study procedures and to determine study limits.

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A meeting was held on October 29, 1980 between town officials, representatives of the FEMA and Andrews & Clark, Inc. (the study contractor) to review study limits established at the May 31, 1979 meeting and to obtain community input useful in the completion of the study.

Preliminary flood boundary delineations were presented by the study contractor for comment at a meeting held on July 6, 1982. This meeting was attended by representatives of the New York Department of Environmental Conservation and the Town of Putnam Valley.

A search for basic data was made at all levels of government. Requested information included historical records of flooding, stream flow records and other published or unpublished reports detailing flood conditions within the study area. On August 28, 1985, the results of the study were reviewed with representatives of the Town of Putnam Valley, the New York Department of Environmental Conservation, and the study contractor.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Putnam Valley, Putnam County, New York. The area of study is shown on the Vicinity Map (Figure 1).

The limits of detailed study in the Putnam Valley were determined by the FEMA with community and study contractor consultation at the meeting on May 31, 1979. Floods caused by the overflow of Canopus Creek, Peekskill Hollow Creek and Shrub Oak Brook within the Putnam Valley Corporate limits were studied in detail. Canopus Creek was studied in detail from its downstream corporate limits to approximately 50 feet upstream of the dam which is located upstream of Canopus Hollow Road. Peekskill Hollow Creek was studied in detail from the downstream corporate limits to just upstream of a private drive located approximately 8500 feet upstream of Route 22. Shrub Oak Brook was studied in detail for its entire length within the community.

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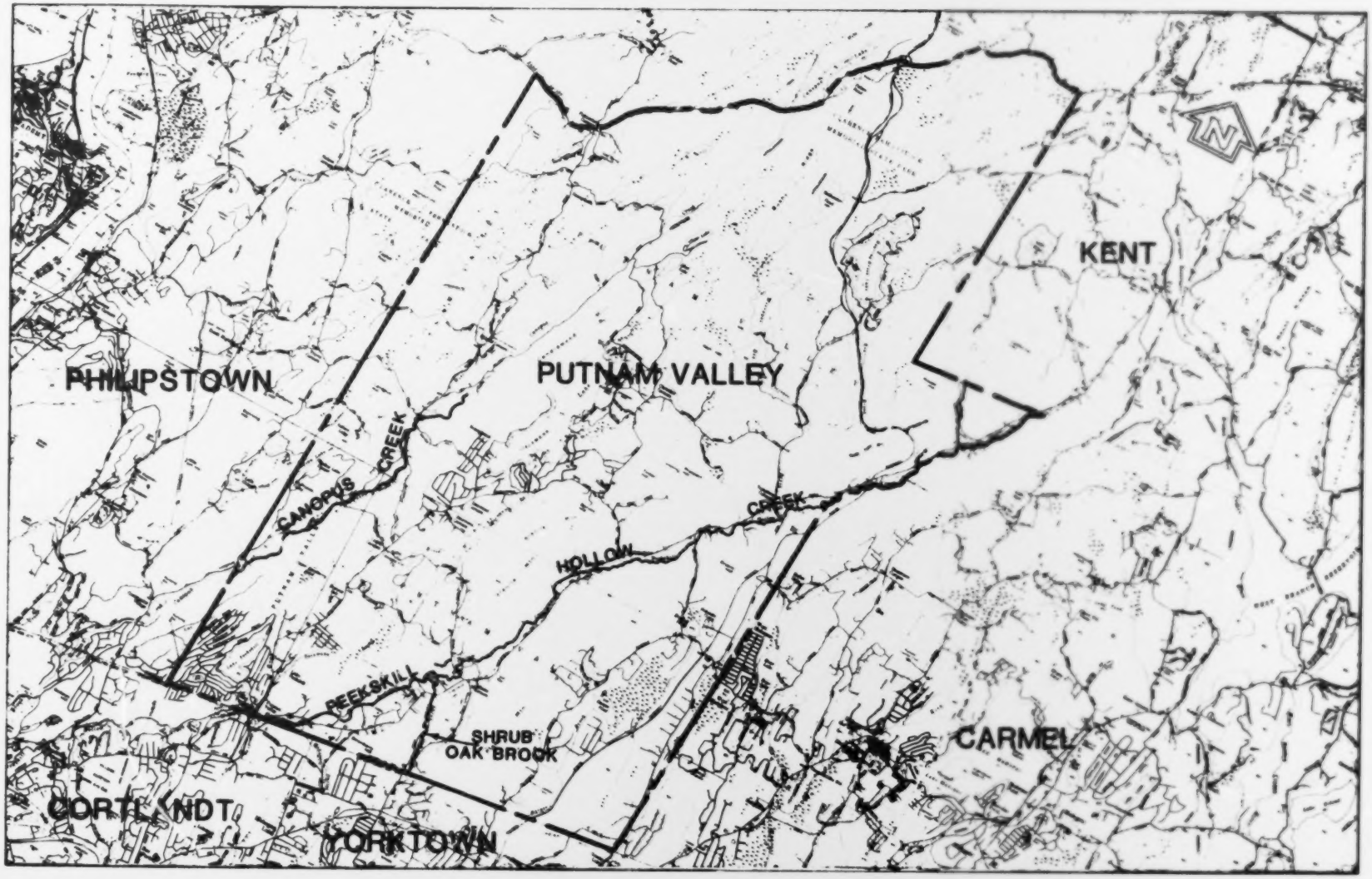

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF PUTNAM VALLEY, NY

(PUTNAM CO.)

APPROXIMATE SCALE

8000 0 8000 16000 24000 FEET

VICINITY MAP

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Approximate methods of analysis were used to study those areas having low development potential or a minimal flood hazard. All areas not designated for study by detailed methods were included in the approximate study. These areas include portions of Canopus Creek and Peekskill Hollow Creek upstream of their limits of detailed study.

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction for the next five years, through June 1987. The scope and methods of the study were proposed and agreed upon by the FEMA and the Town of Putnam Valley.

2.2 Community Description

The Town of Putnam Valley, located in southeastern New York State, is in the western portion of Putnam County. The town is bordered by the Town of Kent on the northeast; the Town of Carmel on the southeast; the Town of Yorktown on the south; the Town of Cortlandt on the southwest; and the Town of Philipstown on the west and north. Putnam Valley is approximately 50 miles north of New York City and 113 miles southeast of Binghamton. Putnam Valley has an area of 42 square miles with a population of 8,944 as reported by the 1980 Census (Reference 1). The Putnam County Planning Department has projected a population of 11,356 for the community in 1990 (Reference 2).

The climate of the Town of Putnam Valley is one of long summers and short winters. The average annual temperature is approximately 50 degrees Fahrenheit, with extremes varying from 24 degrees below zero to 106 degrees above. The average annual precipitation for the area is approximately 45 inches with observed annual extremes ranging from 29.54 to 68.31 inches. The distribution of precipitation throughout the year is fairly uniform, with slightly higher amounts during the summer months (Reference 3).

2.3 Principal Flood Problems

During contacts with government officials, and interviews with residents, areas of problem flooding were discussed. No major flooding problems have occurred, however, it was noted that the water surface

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elevation of Shrub Oak Brook during storm conditions has gradually increased over the past two years. This was attributed to recent land development in upstream areas and its subsequent runoff.

2.4 Flood Protection Measures

The Town of Putnam Valley does not maintain any structural flood control measures but does provide for the cleaning of drainage structures and culverts on a periodic basis. The town also regulates land use in the flood plain areas.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval), have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2 percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one percent chance of annual occurrence) in any 50 year period is about 40 percent (four in 10), and for any 90 year period, the risk increases to about 60 percent (six in 10). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analysis

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for the flooding sources studied in detail in the Town of Putnam Valley.

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Peak discharges for Canopus Creek, and Peekskill Hollow Creek were developed using a regional regression analysis prepared in accordance with methods developed by the U.S. Army Corps of Engineers (COE) (Reference 4). The analysis considered the Log-Pearson Type III coefficients of mean, skew and standard deviation with correlation of annual peak flows at twenty long-range gaging stations.

Peak discharges for the Shrub Oak Brook were developed using a regression analysis prepared in accordance with methods developed by the Federal Highway Administration (FHWA) (Reference 5). The analysis considered the hydrophysiographic characteristics of the study area as well as statistical rainfall information.

Peak discharges developed for the Peekskill Hollow Creek were verified using information published in USGS Bulletin #72, which contains the maximum known stages and discharges of New York streams through 1973 (Reference 6).

A summary of drainage area-peak discharge relationships developed for the Canopus Creek, Peekskill Hollow Creek and Shrub Oak Brook is shown in Table 1, "Summary of Discharges."

Table 1 - Summary of Discharges

Flooding Source - Locations	Drainage Area (SQ. MI)	Peak Discharges (cfs) 10-yr	50-yr	100-yr	500-yr
CANOPUS CREEK					
Downstream Corporate Limits	10.67	454	973	1134	2224
Confluence of West Branch Tributary	5.48	265	587	688	1390
PEEKSKILL HOLLOW CREEK					
Downstream Corporate Limits	32.85	1075	2053	2337	4138
Confluence of Shrub Oak Brook	19.33	703	1385	1587	2891
Adams Corners	18.61	674	1333	1528	2793

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Table 1 - Summary of Discharges (Continued)

Flooding Source - Locations	Drainage Area (SQ. MI)	Peak Discharges (cfs) 10-yr	50-yr	100-yr	500-yr
SHRUB OAK BROOK					
Confluence with Peekskill Hollow Creek	9.54	833	1423	1673	2482

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the flooding sources studied in detail in Putnam Valley were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

The overbank areas of cross sections for the backwater analyses of Peekskill Hollow Creek and Canopus Creek were obtained from aerial photographs flown in December 1980 at a scale of 1:9600 (Reference 7). The channel sections were based on field survey data. All bridges and culverts were field surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

Channel roughness factors (Manning's "n") used in the hydraulic computations, were chosen by engineering judgement and based on field observations of stream and flood plain areas. Roughness values for the main channel of the Canopus Creek range from 0.03 to 0.049, with flood plain roughness values ranging from 0.065 to 0.1 for all floods. Roughness values for the main channel of Peekskill Hollow Creek range from 0.040 to 0.045 with flood plain roughness values ranging from 0.07 to 0.095 for all floods. Roughness values for the main channel of Shrub Oak Brook range from 0.035 to 0.049 with flood plain values ranging from 0.09 to 0.095 for all floods.

Water-surface elevations of floods of the selected recurrence intervals were computed using the U.S. Army Corps of Engineers (COE) HEC-2 step-backwater computer

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program (Reference 8). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water surface elevations for Canopus Creek were based on flood profiles prepared for the Town of Philipstown Flood Insurance Study (Reference 9). Starting water surface elevations for Peekskill Hollow Creek were based on flood profiles prepared for the Town of Cortlandt Flood Insurance Study (Reference 10). Starting water surface elevations for Shrub Oak Brook were calculated using the slope area method. All elevations are referenced from the National Geodetic Vertical Datum of 1929, (NGVD) formerly referred to as Sea Level Datum of 1929; elevation reference marks used in this study are shown on the maps.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly and do not fail.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FEMA as a base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For the streams studied in detail, the boundaries of the 100- and the 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:4800 with a contour interval of 4 feet (Reference 11). In cases where the 100- and the 500-year flood boundaries are close together or collinear only the 100-year boundary has been shown. For streams studied by approximate methods, the boundaries have been delineated using the Flood Hazard Boundary Maps for the Town of Putnam Valley published by the Federal Insurance Administration (Reference 12).

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 2). Small areas within the flood boundaries may lie above the

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flood elevations, and therefore, may not be subject to flooding. Owing to limitations of the map scale and/or lack of detailed topographic data, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, the concept of the floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of the FEMA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plain. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was computed (Table 2).

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. Therefore, "Without Floodway" elevation presented in Table 2 for certain downstream sections of Shrub Oak Brook are lower than the regulatory flood elevations in that area, which must take into account the 100-year flooding due to backwater from other sources.

As shown on the Flood Boundary and Floodway Map, (Exhibit 2), the floodway widths were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the floodway and the 100-year flood are either close together collinear, only the floodway boundary has been shown.

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE [1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
CANOPUS CREEK								
A	640	156	996	1.4	185.5	185.5	186.5	1.0
B	3335	37	160	7.1	191.0	191.0	191.0	0.0
C	5950	81	456	2.5	200.0	200.0	200.4	0.4
D	8310	39	116	9.8	201.0	201.0	201.1	0.1
E	8965	90	245	4.6	216.0	216.0	216.0	0.0
F	9025	220	1114	1.0	221.2	221.2	222.1	0.9
G	9335	79	409	2.8	224.1	224.1	224.8	0.7
H	12370	165	487	2.3	233.8	233.8	234.1	0.3
I	14405	245	1470	0.8	241.3	241.3	242.2	0.9
J	16035	93	641	1.8	247.7	247.7	247.7	0.0
K	16265	114	790	1.4	249.2	249.2	249.2	0.0
L	16985	88	540	2.1	249.9	249.9	250.8	0.9
M	19195	32	77	8.9	269.4	269.4	269.4	0.0
N	21040	30	92	7.5	305.4	305.4	306.0	0.6

[1] FEET ABOVE CORPORATE LIMITS

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF PUTNAM VALLEY, NY

(PUTNAM CO.)

FLOODWAY DATA

CANOPUS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE [1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
PEEKSKILL HOLLOW CREEK								
A	2645	40	224	10.4	125.3	125.3	125.7	0.4
B	3835	50	258	9.1	138.9	138.9	139.9	1.0
C	4735	50	203	11.5	146.2	146.2	146.2	0.0
D	5970	48	263	8.9	159.4	159.4	160.1	0.7
E	6760	76	482	4.9	170.4	170.4	170.4	0.0
F	8830	27	166	14.1	189.0	189.0	189.1	0.1
G	10420	44	224	10.5	199.0	199.0	199.1	0.1
H	12340	144	1057	2.2	218.8	218.8	219.2	0.4
I	14220	266	857	1.9	220.2	220.2	220.6	0.4
J	15570	122	685	2.3	222.8	222.8	223.3	0.5
K	18750	88	332	4.6	225.8	225.8	226.4	0.6
L	19710	238	1955	0.8	234.3	234.3	235.1	0.8
M	21110	252	1310	1.2	234.5	234.5	235.3	0.8

[1] FEET ABOVE CORPORATE LIMITS

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF PUTNAM VALLEY,NY

FLOODWAY DATA

PEEKSKILL HOLLOW CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE [1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
PEEKSKILL HOLLOW CREEK								
N	22340	148	744	2.1	236.0	236.0	236.9	0.9
O	24125	60	355	4.3	248.1	248.1	248.1	0.0

[1] FEET ABOVE CORPORATE LIMITS

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF PUTNAM VALLEY,NY

FLOODWAY DATA

PEEKSKILL HOLLOW CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE [1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
SHRUB OAK BROOK								
A	750	81	267	6.3	219.1	217.6[2]	218.6	1.0
B	1615	97	673	2.5	235.3	235.3	235.3	0.0
C	2310	56	169	9.9	254.4	254.4	254.4	0.0
D	3150	55	460	3.6	289.0	289.0	289.0	0.0
E	3820	118	803	2.1	308.0	308.0	308.0	0.0
F	4410	68	412	4.1	328.2	328.2	328.2	0.0
G	4980	30	137	12.2	351.1	351.1	351.1	0.0
H	5800	90	452	3.7	378.2	378.2	378.2	0.0
I	5960	82	450	3.7	380.5	380.5	380.7	0.2
J	6395	60	331	5.0	390.8	390.8	390.8	0.0

[1] FEET ABOVE CONFLUENCE WITH PEEKSKILL HOLLOW CREEK
[2] ELEVATION COMPUTED WITHOUT CONSIDERATION OF BACKWATER FROM PEEKSKILL HOLLOW CREEK

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF PUTNAM VALLEY, NY

(PUTNAM CO.)

FLOODWAY DATA

SHRUB OAK BROOK

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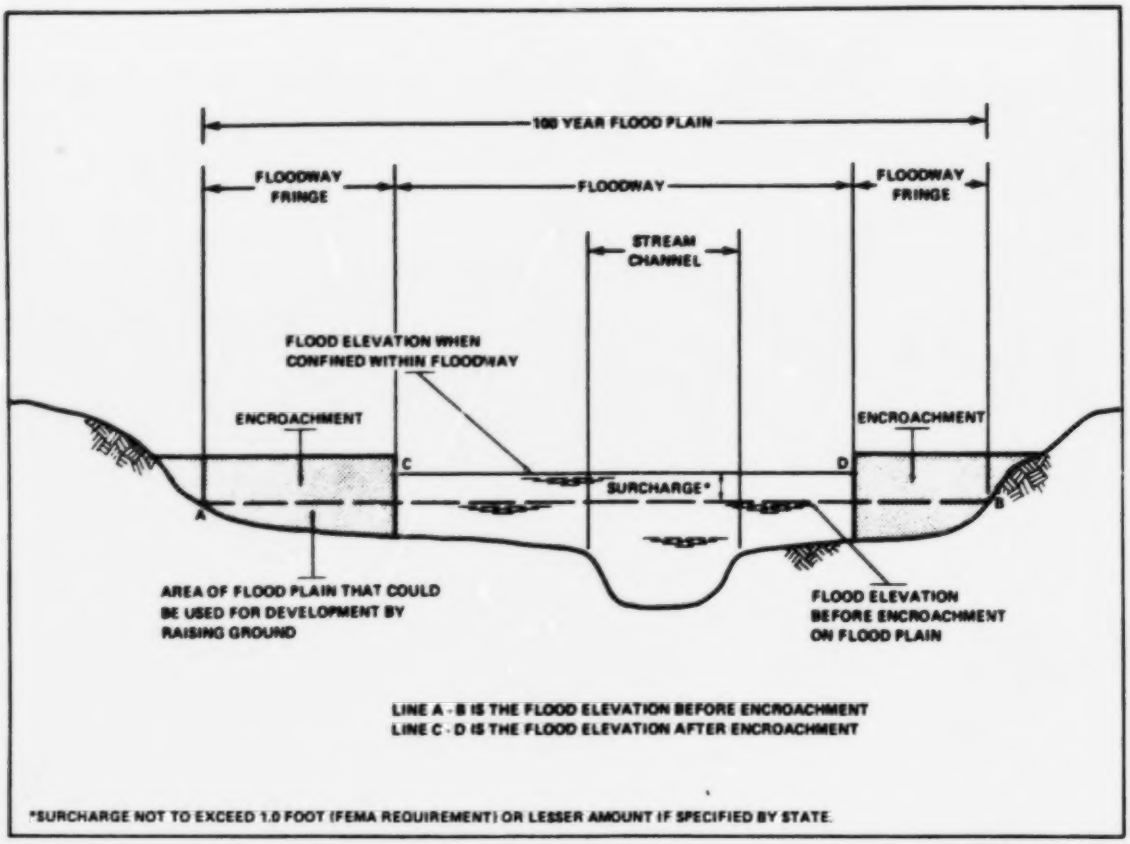
100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC

Figure 2

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

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5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FEMA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each significant flooding source affecting the Town of Putnam Valley.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-year Floods	Variations
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot

The location of the reaches determined for the Town of Putnam Valley are shown on the Flood Profiles (Exhibit 1) and are summarized in the Flood Insurance Zone Data Table (Table 3).

5.2 Flood Hazard Factors (FHFs)

The Flood Hazard Factor is used to correlate flood information with insurance rate tables. Correlations between property damages from floods and their assigned FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot and shown as a three-digit code. For example, if the difference between the water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005 if the difference is 1.4 feet, the FHF is 015, if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, the accuracy for the FHF is to the nearest foot.

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FLOODING SOURCE	PANEL [1]	ELEVATION DIFFERENCE [2] BETWEEN 1.0% (100 YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION [3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Canopus Creek							
Reach 1	05	-1.8	-0.4	1.9	020	A4	Varies
Reach 2	05	-1.6	-0.3	1.3	015	A3	Varies
Peekskill Hollow Creek							
Reach 1	05	-1.9	-0.3	1.5	020	A4	Varies
Shrub Oak Brook							
Reach 1	05	-1.2	-0.3	0.7	010	A2	Varies
Reach 2	05	-1.6	-0.4	1.0	015	A3	Varies

[1] FLOOD INSURANCE RATE MAP PANEL
[2] WEIGHTED AVERAGE
[3] ROUNDED TO THE NEAREST FOOT - SEE MAP

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF PUTNAM VALLEY, NY

(PUTNAM CO.)

FLOOD INSURANCE ZONE DATA

CANOPUS CREEK - PEEKSKILL HOLLOW CREEK - SHRUB OAK BROOK

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of Putnam Valley was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown,or FHF's determined.
Zone A2,A3,A4:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods;base flood elevations shown, and zones assigned according to FHFs.
Zone B:	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot or, areas subject to 100-year flooding from sources with drainage areas of less than one square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the Town of Putnam Valley.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Town of Putnam Valley is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected

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whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FEMA.

6.0 OTHER STUDIES

The Federal Insurance Administration has published Flood Hazard Boundary Maps for the Town of Putnam Valley (Reference 12). This map contains a delineation of flood limits based on approximate methods and historical records of local flooding. The maps were used to verify flood boundaries developed for the Canopus Creek, Peekskill Hollow Creek and Shrub Oak Brook in this Flood Insurance Study.

The United States Geological Survey has prepared a map of flood prone areas for the Town of Putnam Valley and surrounding areas (Reference 13). This map was used to verify flow lines developed for streams studied in detail in the report.

The Soil Conservation Service (SCS) has prepared a report entitled Putnam County Soil Survey, Interim Report (Reference 14). This report delineates flood prone areas based on hydrologic soil groups within the Town of Putnam Valley and surrounding areas. Information contained in the SCS Report was used to verify flood boundaries delineated in this Flood Insurance Study.

The United States Geological Survey has published a bulletin which contains the maximum known stages and discharges of New York streams through 1973 (Reference 6). Information for Peekskill Hollow Creek included in this bulletin was used to verify hydrologic computations prepared for this Flood Insurance Study.

FEMA is currently preparing a Flood Insurance Study for the Town of Philipstown (Reference 9) and has prepared a Flood Insurance Study for the Town of Cortlandt (Reference 10). Hydraulic and Hydrologic information prepared for the Putnam Valley Flood Insurance Study is in agreement with the information contained in these studies.

This study is authoritative for the purposes of the Flood Insurance Program, and the data presented here either supersede or are compatible with previous determinations.

7.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, Federal Emergency Management Agency, 26 Federal Plaza, Room 1351, New York, New York, 10278.

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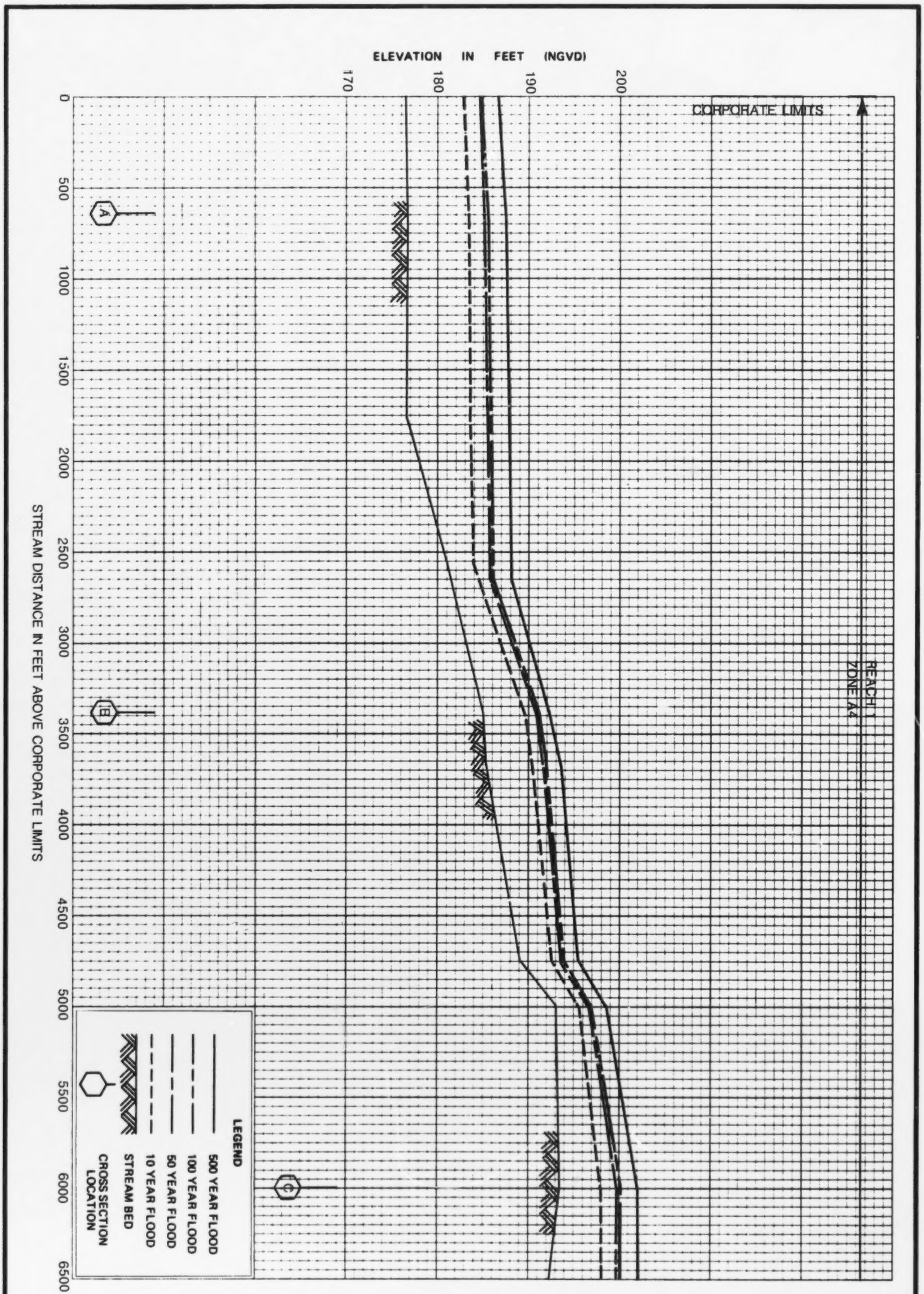

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF PUTNAM VALLEY, NY

(PUTNAM CO.)

01P

FLOOD PROFILES

CANOPUS CREEK

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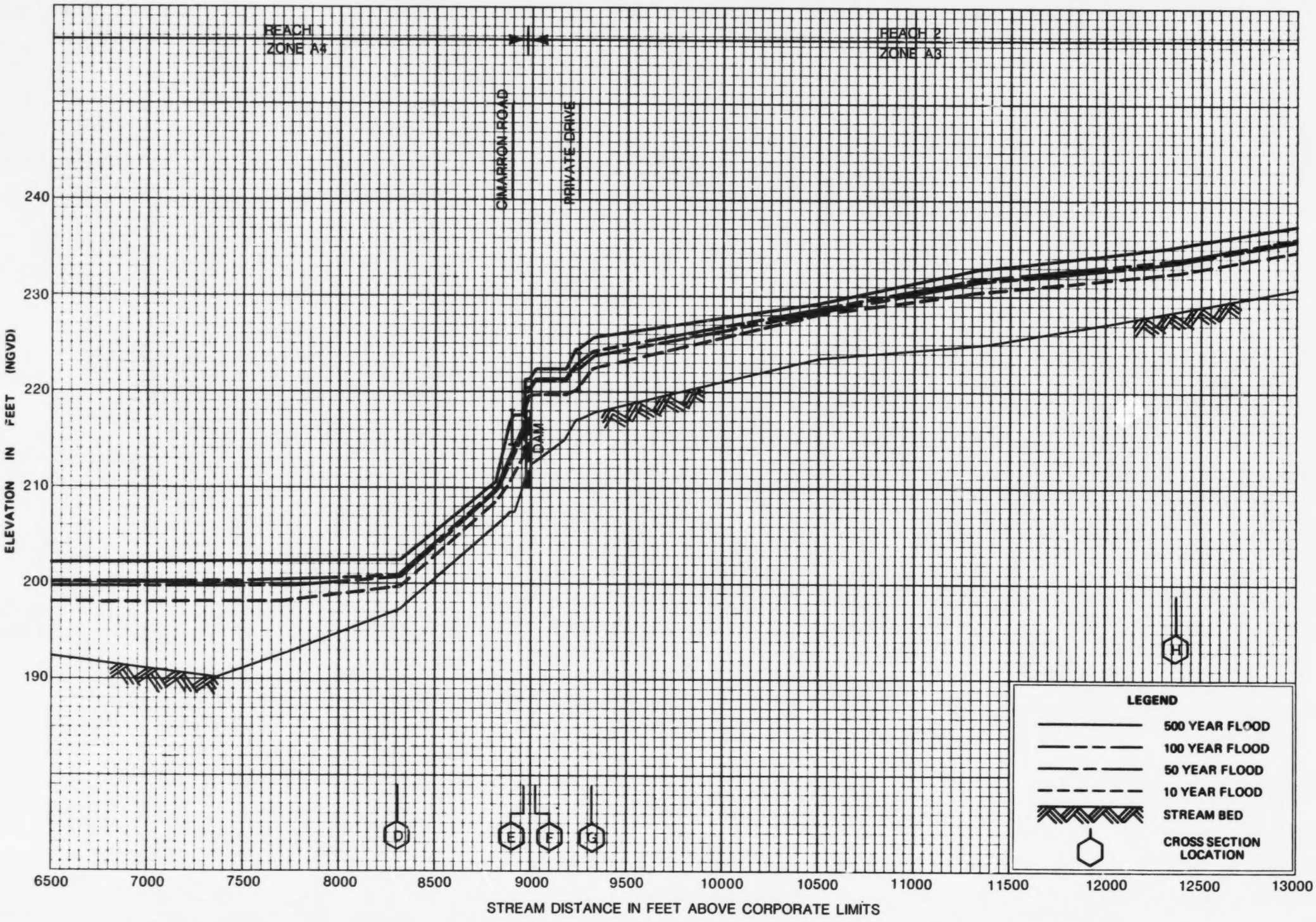

FLOOD PROFILES

CANOPUS CREEK

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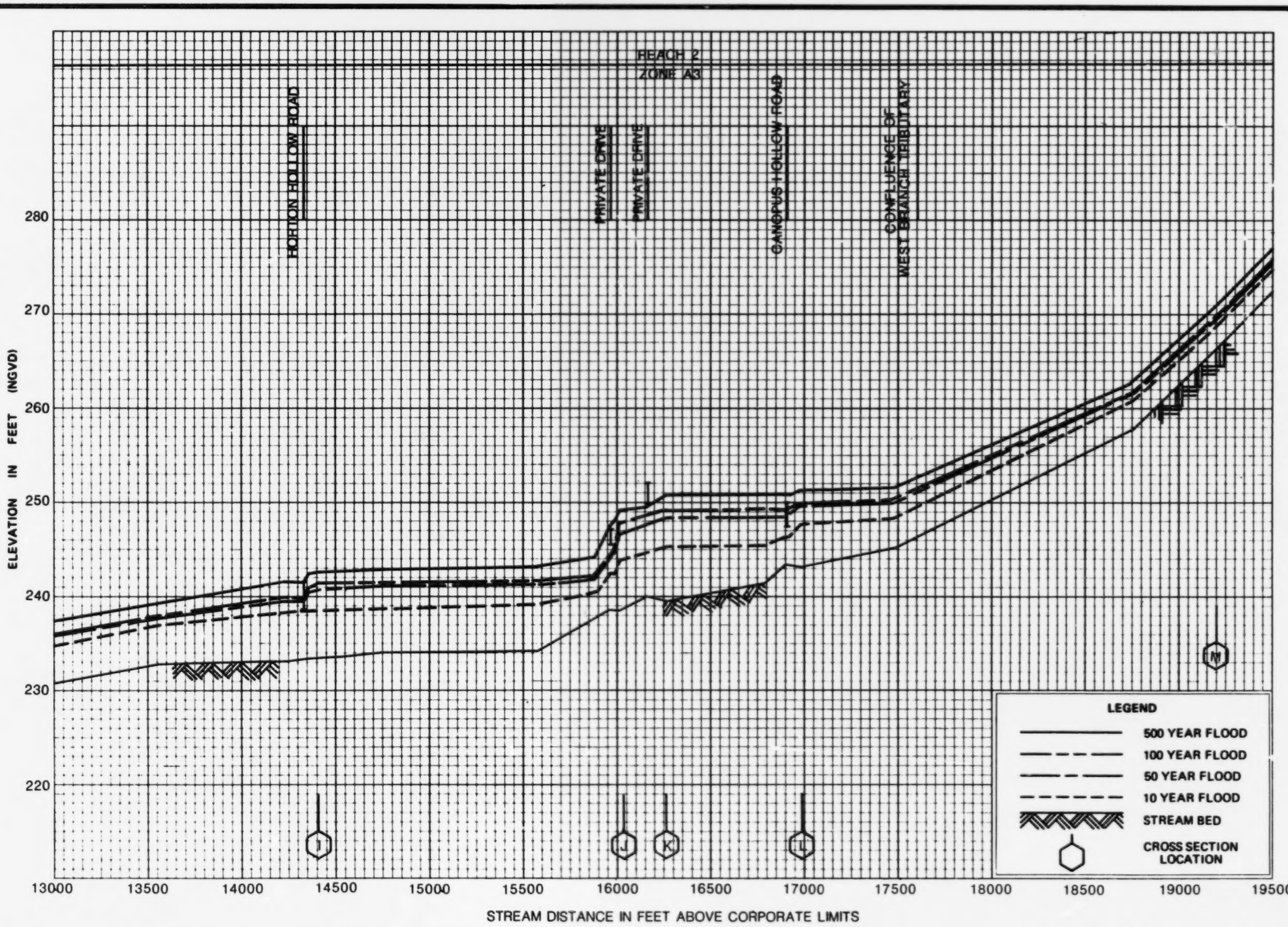

FLOOD PROFILES

CANOPUS CREEK

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03P

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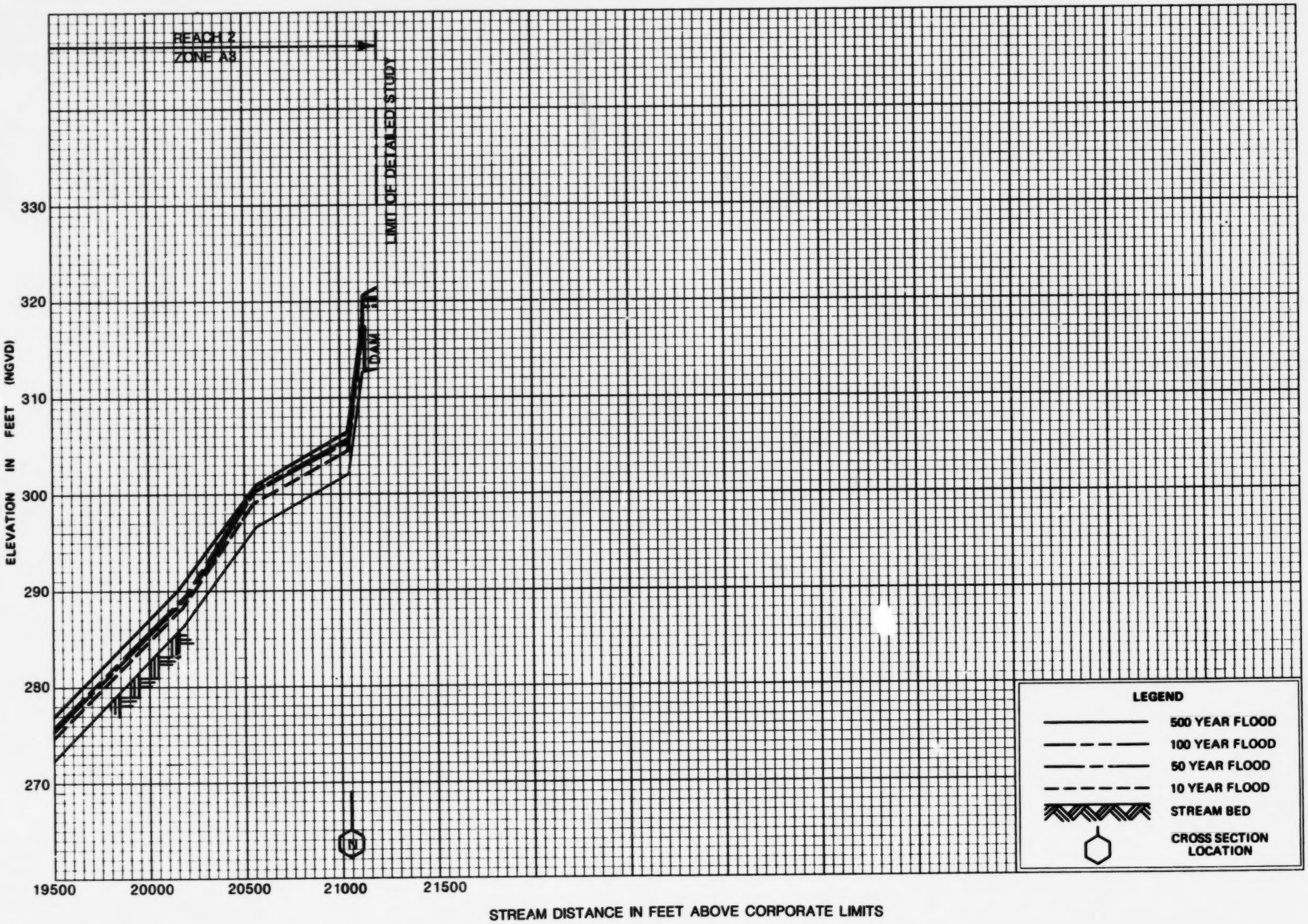

FLOOD PROFILES

CANOPUS CREEK

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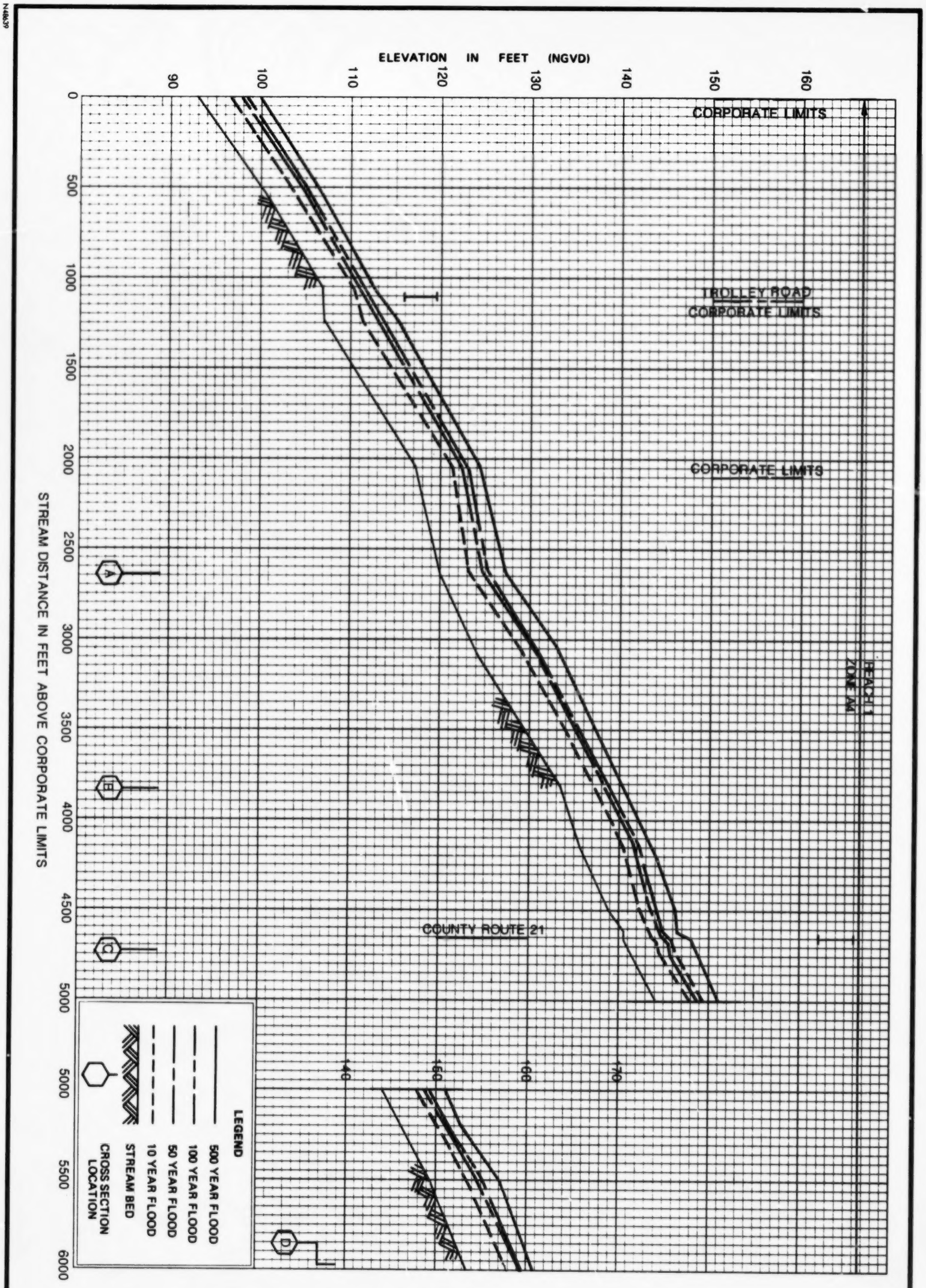

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FLOOD PROFILES

PEEKSKILL HOLLOW CREEK

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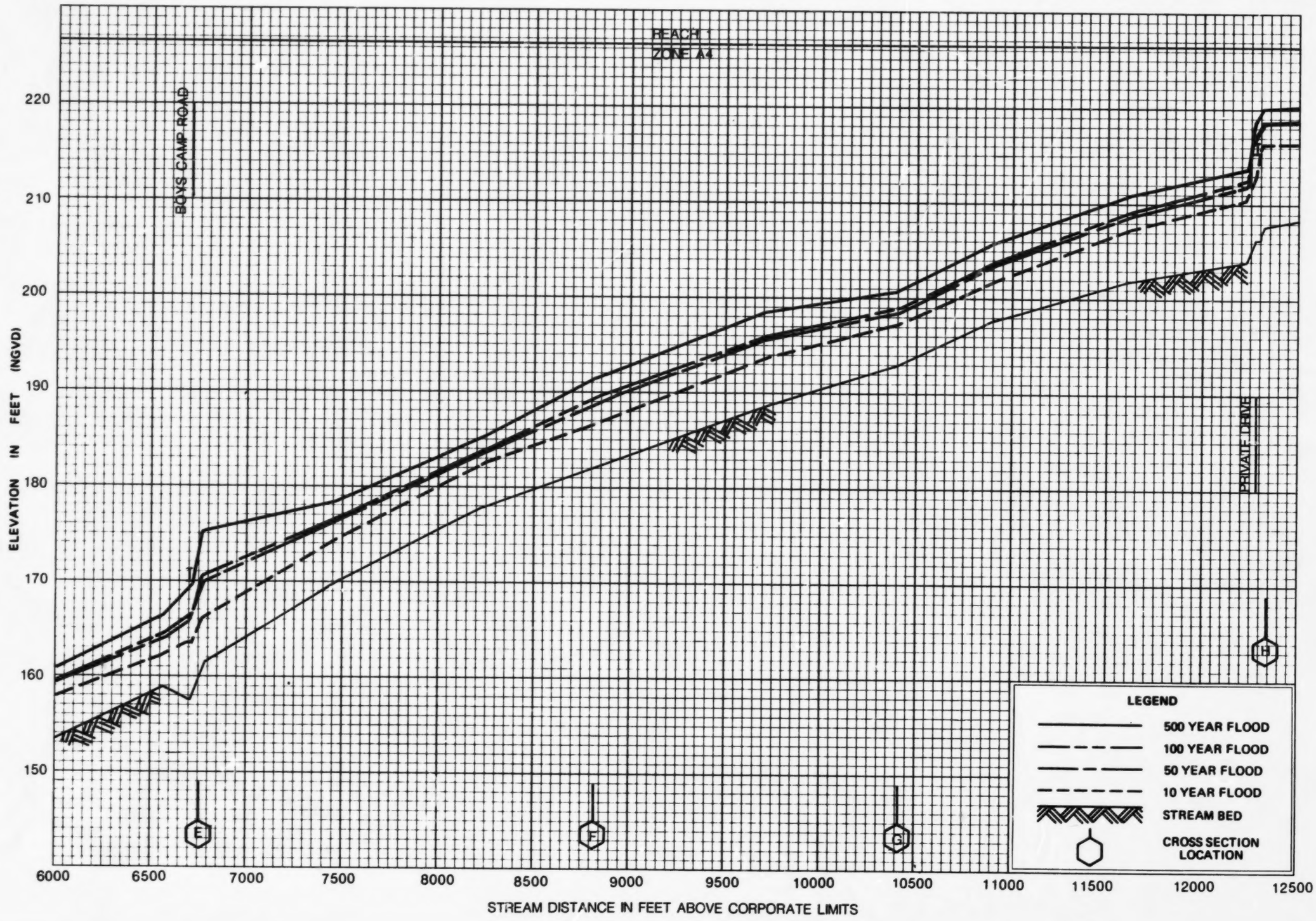

FLOOD PROFILES

PEEKSKILL HOLLOW CREEK

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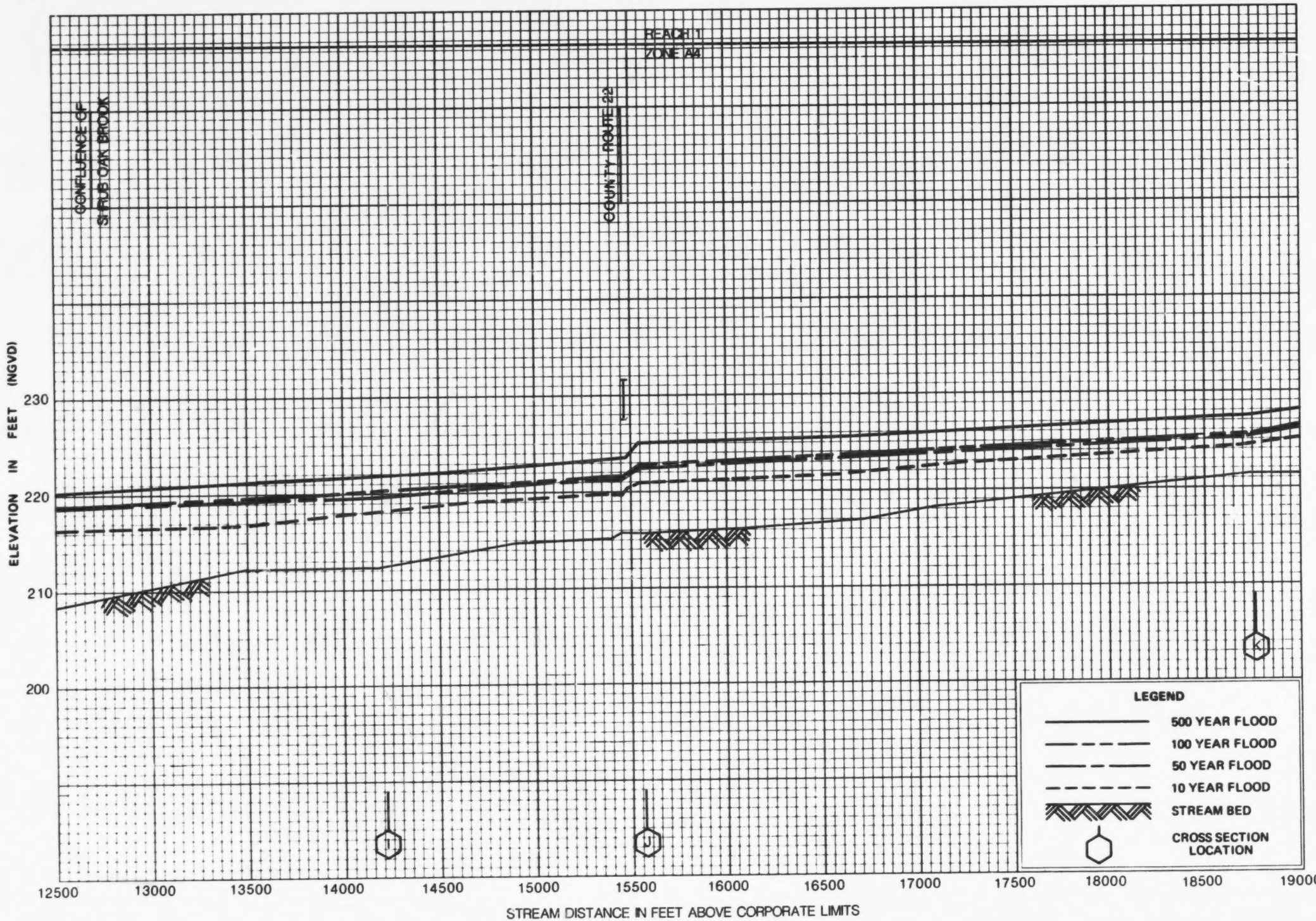

FLOOD PROFILES

PEEKSKILL HOLLOW CREEK

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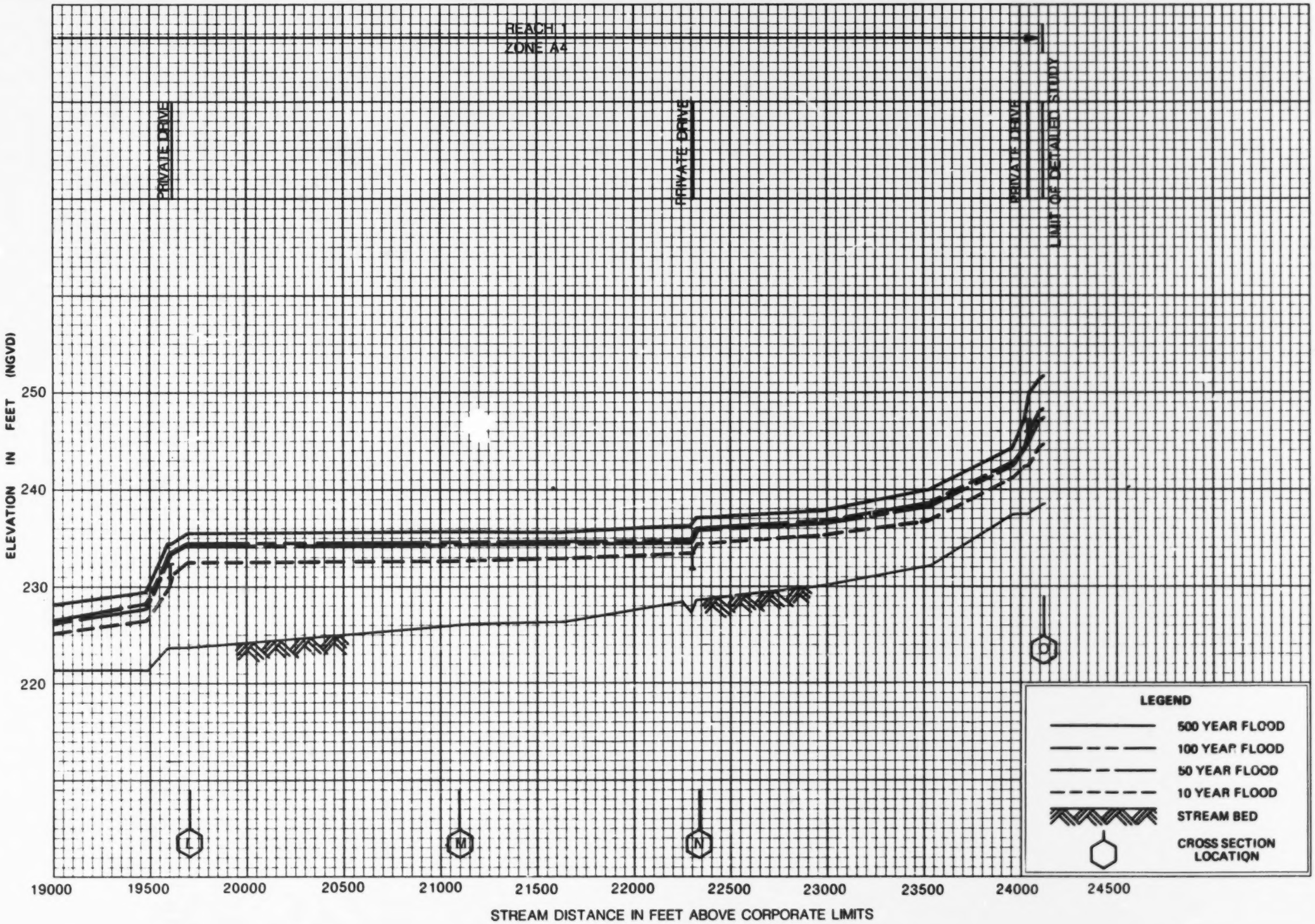

FLOOD PROFILES

PEEKSKILL HOLLOW CREEK

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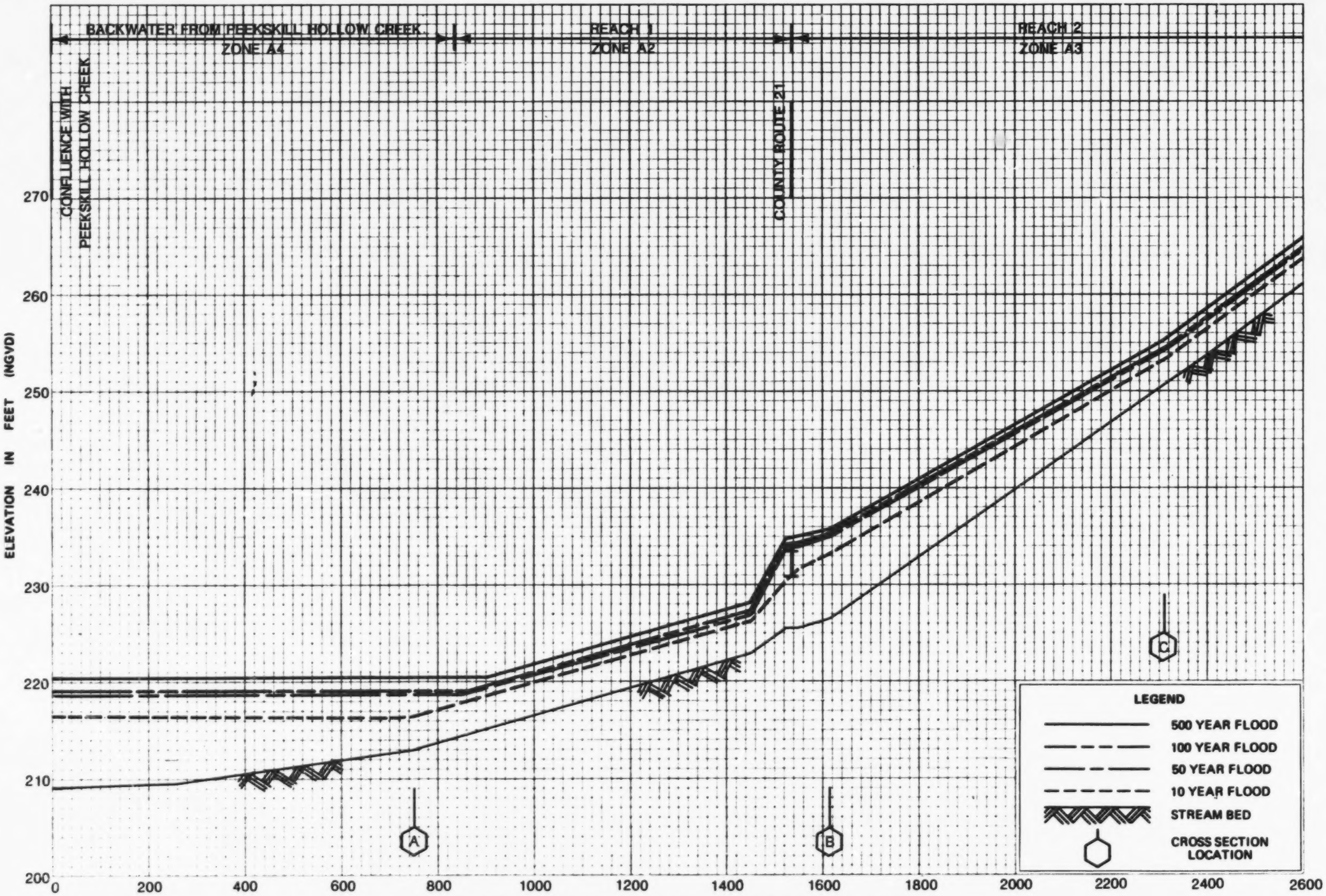

FLOOD PROFILES

SHRUB OAK BROOK

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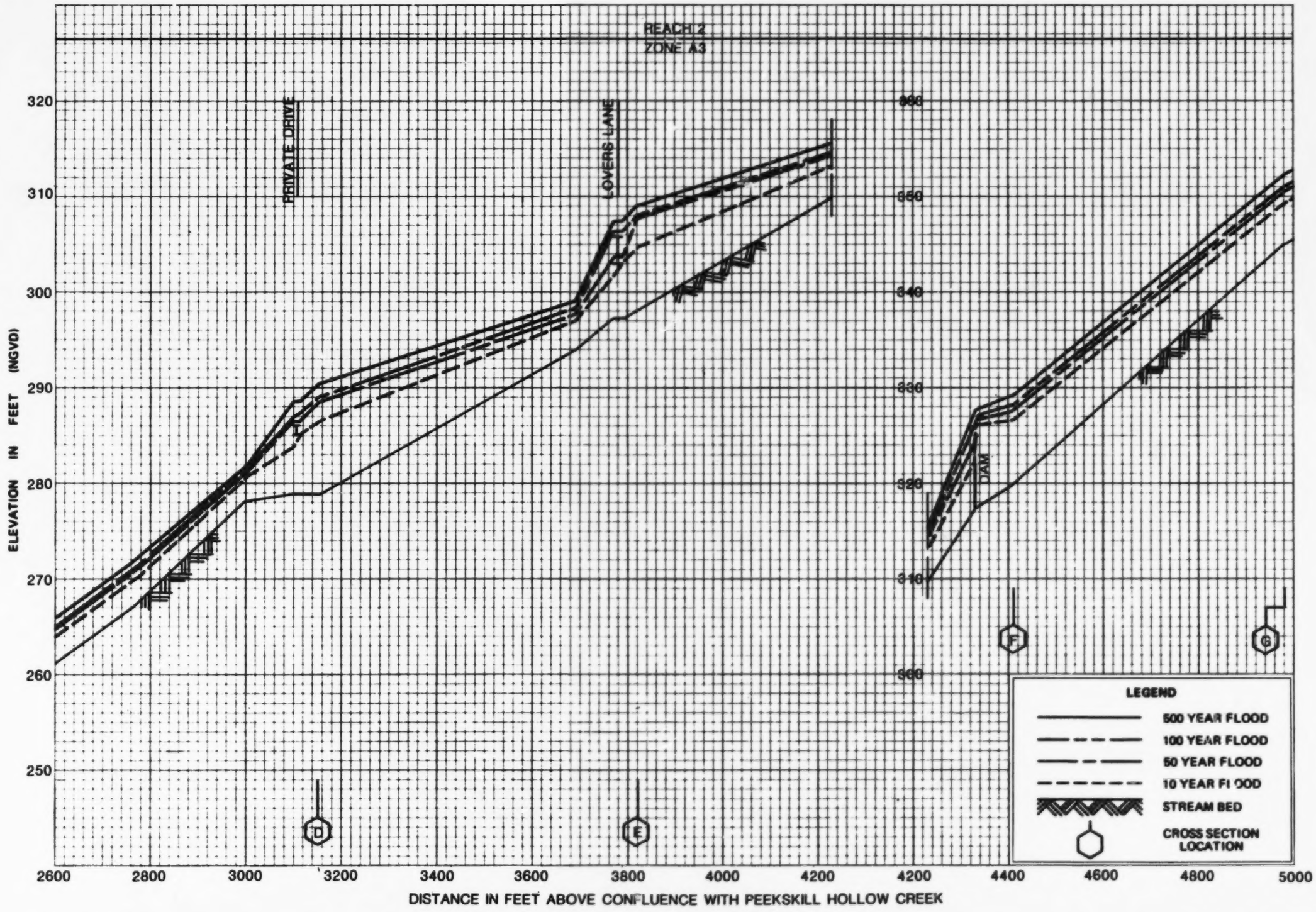

FLOOD PROFILES

SHRUB OAK BROOK

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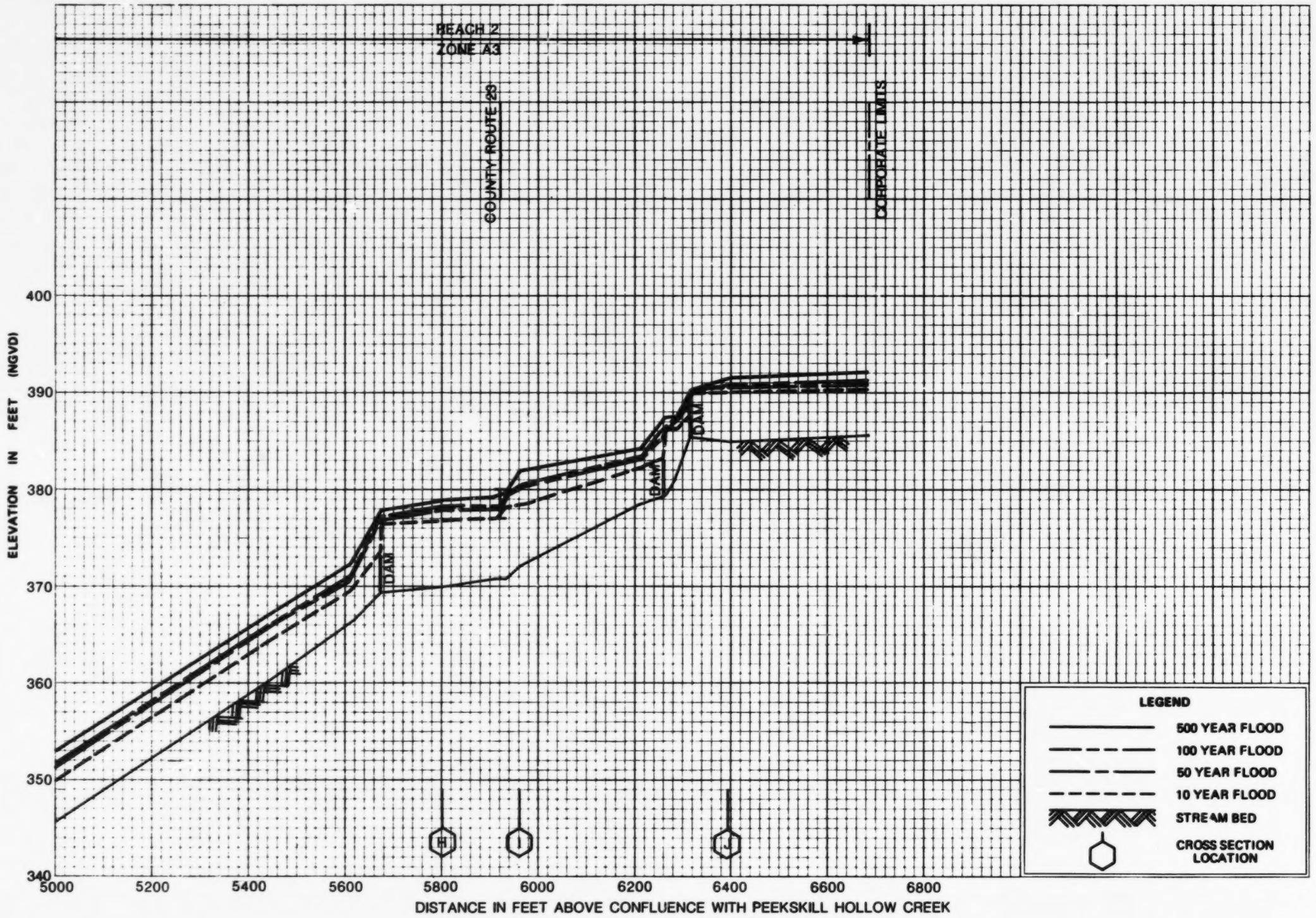

FLOOD PROFILES

SHRUB OAK BROOK

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